

**STATE OF CALIFORNIA
ENERGY RESOURCES CONSERVATION
AND DEVELOPMENT COMMISSION**

In The Matter Of)	Docket No. 96-RDD-1890
Implementation of Restructuring)	
Legislation (Public Utilities)	
Code § 381, [AB 1890]): RD&D)	
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**STRATEGIC PLAN FOR
IMPLEMENTING THE RD&D PROVISIONS OF AB 1890**

**JUNE 1997
CALIFORNIA ENERGY COMMISSION**

P500-97-007

June 16, 1997

The Honorable Pete Wilson, Governor
California State Capitol, First Floor
Sacramento, California 95814

Energy Commission's Strategic Plan For Implementing The RD&D Provisions Of AB 1890

Dear Governor Wilson:

Following the passage of AB 1890 last year, the California Energy Commission directed its Research, Development and Demonstration (RD&D) Committee (Commissioner David A. Rohy, presiding) to prepare a proposed plan for implementing the public interest RD&D provisions of that legislation. As the Chair and Vice Chair of the Energy Commission, we are pleased to report that on May 28, 1997, the Commission completed this important effort and adopted its "**Strategic Plan For Implementing The RD&D Provisions Of AB 1890**," which we are hereby forwarding to you, the Legislature, and others today. This RD&D Strategic Plan was developed over a eight month period of time, with extensive public input received during two separate Commission hearings, three separate Committee hearings, and seven day-long public advisory group meetings which were held throughout the state.

As reflected in a letter to the RD&D Committee dated March 31, 1997 (reproduced in Appendix A of the Strategic Plan), more than 70 separate organizations and individuals (representing a wide spectrum of interests concerned with public interest RD&D issues) endorsed the RD&D Advisory Group Report which provided the major recommendations, and much of the actual text, for the Commission's RD&D Strategic Plan. We have expressed our sincere appreciation to the many individuals and organizations who gave exceptional amounts of their time and effort to make this RD&D Strategic Plan possible.

We look forward to working with you and the Legislature in enacting the followup legislation which is needed to implement this important RD&D Strategic Plan.

Sincerely yours,

WILLIAM J. KEESE
Chairman

Enclosure

DAVID A. ROHY, Ph.D.
Vice Chair and Presiding Member
RD&D Committee

RD&D STRATEGIC PLAN

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RD&D STRATEGIC PLAN

CHAPTER I: INTRODUCTION

A. BACKGROUND CONCERNING THIS RD&D STRATEGIC PLAN

1. Role of the Governor and Legislature

On September 23, 1996, Governor Pete Wilson signed into law landmark legislation that will bring substantial competition to California's electricity industry. (Chapter 854, Statutes of 1996 [AB 1890]). With regard to energy-related research, development and demonstration (RD&D) activities, AB 1890 specifically requires the California Energy Commission (Energy Commission) to fund certain "public interest" RD&D efforts that will "advance science or technology . . . not adequately provided by competitive and regulated markets," pursuant to administration and expenditure criteria established by the Legislature. (Public Utilities Code Sections 381(a), 381(b)(2), 381(c)(2), and 381(f)). The California Public Utilities Commission (CPUC) is given responsibilities for other specified RD&D activities. It is anticipated that additional legislation regarding specific administration and expenditure criteria for this public interest RD&D program will be enacted during the 1997 Legislative Session.

2. Role of the California Public Utilities Commission

Prior to the passage of AB 1890, the California Public Utilities Commission (CPUC) adopted its Electric Industry Restructuring Policy Decision (D. 95-12-063). This decision held, among other things, that in the future only those

investor-owned utility (IOU) RD&D activities which support "regulated" utility functions should be funded through traditional rates. However, the CPUC also stated that RD&D activities which serve a broader public interest "should not be lost in the transition to a more competitive environment." To address this concern, the CPUC expressly recommended that a non-bypassable surcharge on retail sales of electricity be collected to provide for these "public goods" RD&D efforts.

Subsequently, the CPUC sanctioned an RD&D Working Group (comprised of the major participants involved with utility RD&D efforts) to prepare a detailed report on implementing the RD&D policies contained in the Restructuring Policy Decision. That **RD&D Working Group Report** was filed with the CPUC on September 6, 1996, and it recommended a definition of "public interest" RD&D activities which is virtually identical to the language that was adopted by the Legislature in AB 1890.

Following the filing of that report, and the enactment of AB 1890, the CPUC was called upon to determine how much of the annual minimum RD&D surcharge of \$62.5 million, authorized in the legislation, should be allocated to the California Energy Commission for public interest RD&D activities not related to the IOU's transmission and distribution (T&D) functions, and how much should be allocated to the utilities for public interest T&D functions, which remain under the jurisdiction of the CPUC. After considering the oral arguments and legal briefs filed by the parties, the CPUC issued its Public Purpose Program Decision (D. 97-02-014).

The CPUC's Public Purpose Program Decision holds, among other things, that "\$61.8 million of the public interest funds should be allocated to the Energy

Commission for non-T&D public interest RD&D," and that \$700,000 should be allocated to the utilities "for annual T&D-related public interest RD&D expenditures." (D. 97-02-014, pp. 55-56). The decision also finds that: ". . . . These specific [AB 1890] public interest RD&D funds are not intended to provide for the utilities' regulated RD&D functions." (Finding # 16, p.83). However, the decision also finds that "AB 1890 does not preclude the Energy Commission from determining that certain RD&D efforts should be considered 'public interest' rather than 'regulated' and, accordingly, from providing utilities with funding out of the public interest RD&D surcharge monies to pursue such activities." (Finding # 24, p.84). Finally, the decision states that "the potential overlap in scope and agency responsibilities for all public purpose areas should be addressed through coordination with the Energy Commission, to the extent possible." (Conclusion # 22, p.89).

3. Role of the California Energy Commission

At an en banc public hearing on October 16, 1996, the California Energy Commission determined that a plan should be developed for implementing the public interest RD&D provisions of AB 1890 for which the agency has jurisdiction, and the Energy Commission would also provide input to the Legislature regarding the appropriate administration and expenditure criteria for this RD&D program. The Energy Commission then assigned these matters to its RD&D Committee with directions to (1) conduct collaborative, non adjudicatory, public hearings and workshops on these topics through May of 1997; and (2) prepare a proposed RD&D plan for the full Commission's consideration and adoption by mid-1997.

The RD&D Committee held its initial public hearing regarding these matters on December 2, 1996. Shortly thereafter, an ad hoc RD&D advisory group (group) was formed to prepare recommendations for the Committee on implementing the public interest RD&D provisions of AB 1890. This ad hoc advisory group was open to anyone who wished to participate, and it began work shortly after the Energy Commission's RD&D Committee held its initial hearing on implementing AB 1890 in December of 1996. Group participants represented a broad cross-section of entities concerned with California's energy-related public interest RD&D activities, including representatives from private sector companies, investor-owned and municipal utilities, state and federal research organizations, universities, public interest organizations, and various government agencies.

The advisory group held seven, day-long, public workshops throughout the state from December 17, 1996, through March 24, 1997, and updated the RD&D Committee regarding its work-in-progress at a public hearing held in Sacramento on February 5, 1997. At that time the Committee also received recommendations from the group regarding appropriate "administration and expenditure" criteria for consideration by the Legislature.

The advisory group submitted its **"Strategic Plan Report On Implementing The RD&D Provisions Of AB 1890"** (Strategic Plan Report or Report) to the RD&D Committee on March 31, 1997. (See Appendix A for a listing of the more than 70 organizations and individuals who endorsed that Report). The Committee then held a day-long public hearing concerning the contents and issues raised in that report on April 17, 1997. After carefully listening to the testimony presented at that hearing, and reviewing the contents of the Report, the RD&D Committee prepared for the full Commission's consideration and

adoption a **"Proposed Strategic Plan For Implementing The RD&D Provisions Of AB 1890"** (Proposed RD&D Strategic Plan or Proposed Plan).

During the Energy Commission's public business meeting on May 28, 1997, the Commission received and considered additional public comments on the Committee's Proposed RD&D Strategic Plan. On balance, the Commission finds that the recommendations contained in the Proposed Plan constitute an excellent foundation for the RD&D Strategic Plan which follows. Indeed, much of the Commission's RD&D Plan (as adopted at the May 28 business meeting) is taken directly from the advisory group's Report and the Committee's Proposed Plan. The Commission wishes to thank all of the individuals and organizations who participated in the lengthy advisory group process for your outstanding contributions to the development of this RD&D Strategic Plan. Actual implementation of the public interest RD&D program, in accordance with the Commission's Final RD&D Strategic Plan, is currently expected to begin on January 1, 1998, as called for in AB 1890.

B. SUMMARY OF THE RD&D STRATEGIC PLAN CHAPTERS WHICH FOLLOW

Chapter II of the Energy Commission's RD&D Strategic Plan first identifies the primary "Mission" and "Objectives" which the Commission believes that California's energy-related public interest RD&D program (referred to herein as the "Public Interest Energy Research" or "PIER" program) should seek to accomplish.² The Mission and Objectives contained in Chapter II are also intended to provide a fundamental framework for the "administration and

² The term "Public Interest Energy Research" or "PIER" program replaces the term "Energy Research California" or "ERC" program, as used in the March 31 Advisory Group Report.

expenditure" criteria which the Legislature is expected to adopt in August 1997. In essence, the Commission recommends that the PIER program be designed to further California's long-standing mission of providing environmentally sound, safe, reliable and affordable energy services and products to its citizens. This mission is to be achieved by focusing on specified RD&D activities, while implementing the PIER program in an efficient, merit-driven, and public manner.

Chapter III identifies the major substantive RD&D categories and objectives on which the PIER program should focus. These focus areas include renewable energy, end-use energy efficiency, environmentally preferred advanced generation, and environmental research. The chapter also sets forth the need for strategic RD&D activities, eligibility guidelines, selection criteria, and a selection process by which proposals seeking funding from the PIER program can be evaluated. Chapter IV outlines the means by which the PIER program should be governed. This chapter identifies various governing and/or administrative functions which must be addressed (e.g. policy input, project funding mechanisms, coordination, program evaluation, etc.), and then discusses the role of the governing structure and advisory groups in carrying out these various functions. The chapter ends by listing the major remaining steps which must be taken if the PIER program is to be operational on January 1, 1998, as AB 1890 and the Commission itself intend.

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RD&D STRATEGIC PLAN

CHAPTER II: MISSION AND OBJECTIVES

A. BACKGROUND REGARDING DEVELOPMENT OF THE MISSION AND OBJECTIVES

The Energy Commission has concluded that two fundamentally different types of planning documents are needed to successfully implement California's energy-related public interest RD&D program, to wit: (1) a "Strategic Plan," which broadly describes the overriding "vision" and the general methods for implementing the RD&D provisions of AB 1890; and (2) an "Operational Plan," which subsequently provides the essential details needed to carry out the

strategic document. This current document constitutes the Commission's RD&D Strategic Plan; the operational plan(s) will be developed subsequently.

With this orientation in mind, the Energy Commission has fully recognized the need to identify the basic "Mission"³ and an essential set of "Objectives"⁴ for the RD&D Strategic Plan. The Commission has also concluded that the strategic statement of Mission and Objectives should be used as the fundamental framework for any "administration and expenditure" criteria which the Legislature subsequently adopts in implementing the RD&D provisions of AB 1890.

In developing its recommended Mission and Objectives, the Energy Commission took note of the **"Working Group Report On Public Interest RD&D Activities"** (submitted to the CPUC on September 6, 1996), the **"Strategic Plan Report On Implementing The RD&D Provisions Of AB 1890"** (submitted to the Commission's RD&D Committee on March 31, 1997), and the many important ideas presented by a large number of RD&D experts who testified before the Energy Commission RD&D Committee during the development of this RD&D Strategic Plan. Based on these outstanding background materials, and the extensive practical experience and knowledge of many of the individuals who testified before the Committee and Commission, the Energy Commission has decided that the Mission and Objectives for the

³ The word "Mission" as used in this Strategic Plan means a broad-reaching general statement that provides guidance for the development of goals and objectives. It can be characterized as "where you want to go" or "what you ultimately want to achieve."

⁴ The word "Objective" as used in this Strategic Plan means a statement of intent that leads to the attainment of the mission, but is not necessarily focussed or measurable.

RD&D Strategic Plan, and the Legislature's related "administration and expenditure" criteria, should identify the key "substantive" areas of program focus, as well as the major "process" objectives which the PIER program should achieve when being implemented.

A fundamental tenet reflected in the Energy Commission's recommended Mission and Objectives is the need for balance between competing imperatives, such as conducting a focussed yet flexible program, which is merit-driven and efficient but also responsive to public input and concerns. With this background in mind, we now turn to the Mission and Objectives adopted by the Commission and recommended to the Legislature.

B. MISSION AND OBJECTIVES FOR THIS PUBLIC INTEREST RD&D PROGRAM

The Mission and Objectives set forth below were developed as an integrated set of policies to provide direction for the PIER program. Thus, for example, while concepts included in the Mission statement are not specifically restated in the Objectives, all elements should be considered to be of equal importance in the Strategic Plan.

Moreover, in order to maintain California's national and international leadership role in the field of energy, the Energy Commission has concluded that the Legislature should embody the following Mission and Objectives in any "administration and expenditure criteria" which it may adopt when implementing the RD&D provisions of AB 1890.

MISSION: The mission of the "Public Interest Energy Research" program is to conduct public interest energy research that seeks to improve the quality of life for California's citizens by providing environmentally sound, safe, reliable and

affordable energy services and products. "Public interest energy research" includes the full range of research, development and demonstration activities that will advance science or technology not adequately provided by competitive and regulated markets.

OBJECTIVES:⁵ The objectives of the "Public Interest Energy Research" program are to:

#1. Develop and implement a robust public interest RD&D portfolio of projects that addresses California's energy needs and initially focuses on end-use energy efficiency, environmentally preferred advanced generation, renewable energy technologies, and environmental issues. This portfolio shall also provide strategic energy research. The public interest portfolio would include public interest system reliability RD&D not covered by the CPUC.

#2. Create and maintain a public interest RD&D program that balances risks, timeframes and public benefits in a manner consistent with California's energy policies.

#3. Create a public interest RD&D knowledge base and disseminate information that will allow citizens, businesses, government and other entities to make informed decisions concerning energy technologies and services.

#4. Ensure that the public interest RD&D program is connected to the market by: (a) collaborating with market and public interest stakeholders to determine research and market needs during program planning; (b) incorporating the assessment and understanding of market needs and technology status into appropriate phases of RD&D projects; and/or (c) transferring public interest RD&D results into the marketplace through partnerships and other actions.

#5. Ensure public input and accountability for the public interest RD&D program by: (a) conducting an open and flexible planning and decision-making process which involves stakeholders in both planning and implementing the program; (b) using advisory committees and expert panels to guide programs and evaluate project proposals; and (c) using an independent group for periodic overall program review and evaluation.

⁵ The text for Objective #4, below, was developed by the RD&D Committee to address and resolve the three differing versions of the "market connection" Objective #4 contained in the advisory group's Report.

#6. Ensure the efficient administration and stewardship of public interest RD&D funds by: (a) implementing a streamlined project acquisition and funding process; (b) using prescribed project evaluation criteria to select projects based on merit; (c) leveraging limited public interest RD&D funds through public/private partnerships to the extent possible; (d) managing projects flexibly and effectively; and (e) avoiding excessive overhead costs.

#7. Provide leadership and coherence for California's public interest RD&D efforts by: (a) coordinating with public and private RD&D entities; and (b) integrating this effort with the Energy Efficiency/Renewables programs and other public interest energy efforts.

C. ISSUES CONCERNING THE RECOMMENDED MISSION AND OBJECTIVES

The Commission has taken note of the fact that there was remarkable unanimity within the RD&D advisory group and the Committee on virtually all of the issues pertaining to the recommended Mission and Objectives statements. Three Mission and Objectives issues warrant further discussion in this RD&D Strategic Plan.

First, a few members of the group raised concerns about whether the Mission of the PIER program should focus exclusively on "electricity" as opposed to "energy" products and services, since electricity ratepayers alone are presently required to pay for the RD&D surcharge. While this "equity" concern is readily understood by the Committee and Commission, it has been pointed out that RD&D efforts often cut across energy lines, thereby impacting electricity users even when electricity *per se* is not the focus of the inquiry (e.g. RD&D efforts concerning leaky air ducts can provide significant benefits for both natural gas and electricity customers). In keeping with the Energy Commission's preference for granting reasonable flexibility to the PIER program administrator wherever possible, the Commission has decided to use the word "energy" rather than "electricity" in its recommended Mission statement.

Second, the Committee and Commission considered whether the "efficiency" focus in Objective #1 should be limited to "end-use" efficiency only. It was noted that RD&D activities pertaining to "generation" efficiency may be viewed by some as more appropriate for the competitive sector to fund, particularly given the rapidly emerging deregulation of the generation market. However, other witnesses have pointed out that not all areas of "generation" research are competitive, and that many ongoing market failures continue to exist in the area of advanced generation. The Energy Commission has concluded that the PIER program should focus on both end-use energy efficiency and environmentally preferred advanced generation, as well as renewable technologies and environmental issues.

Finally, the Energy Commission is concerned with insuring that public interest RD&D efforts are sufficiently "connected to the market" to avoid the so-called commercialization "Valley of Death," in which successful RD&D projects nevertheless fail to yield commercially useful products and services, thereby effectively wasting the RD&D funds which have already been expended. However, the Commission is also aware that public interest RD&D funds are extremely limited, and should not be used for near-term "commercialization" efforts which are better funded by other public interest programs or by the private sector itself. Thus, for example, innovative "market transformation" activities regarding end-use energy efficiency or renewable technologies should be funded primarily through public interest efforts such as the Energy Efficiency and Renewables programs authorized by AB 1890. Likewise, traditional market introduction efforts for energy products should be funded primarily by private entities, not by the PIER program. The language which the Commission has adopted for Objective #4 addresses the "commercialization" balancing issue described above. Specifically, Objective #4 requires

collaboration, partnerships and other appropriate actions with both market and public interest stakeholders to ensure that market needs are taken into account during the planning, implementation and technology transfer phases of the PIER program.

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RD&D STRATEGIC PLAN

CHAPTER III: RD&D FOCUS AREAS AND SELECTION PROCEDURES

A. INTRODUCTION

The Mission and Objectives discussed in Chapter II of this RD&D Strategic Plan are intended to provide overall guidance for implementing the PIER program. Chapter III provides further detail regarding the primary focus areas and objectives of the program, as well as the eligibility and selection criteria for evaluating specific proposals. Given the uncertain yet dynamic conditions brought about by deregulation and other factors, it is vital to build flexibility into the process so that the PIER portfolio can be responsive to changing "technology-push" and "market-pull" factors across the spectrum of public interest energy RD&D activities.

The Energy Commission has identified four initial focus areas for the PIER program. These are listed in Objective #1 of Chapter II as end-use energy efficiency, environmentally preferred advanced generation, renewable technologies, and environmental research. The PIER portfolio should also provide strategic energy research, including systems-related research projects which cut across focus areas to improve electricity system reliability. Chapter III expands on these topics by providing definitions, issues and objectives for each of the four focus areas.

The four focus areas listed below are intended to provide strategic guidance, and are not intended to define specific program structure. Possible ways of structuring the PIER program include organizing by energy sectors, by types of

solicitations, or by the selected focus areas. The program structure should be defined in the operational plan(s).

In addition to the four focus areas listed below, some PIER program funding should also be dedicated to **strategic energy** RD&D projects and activities. This strategic effort would include RD&D activities that cut across two or more of the focus areas, represent potential "orders of magnitude" advances, or provide energy-related public interest information assessments and/or innovations that do not fit within the other focus areas.

"Cross-cutting" strategic energy RD&D activities could include system-related projects that utilize renewables, environmentally preferred advanced generation, energy efficiency and environmental technologies in an integrated manner.

Examples of strategic RD&D efforts that could provide "orders of magnitude" benefits include: (1) innovative projects and activities that result in "revolutionary" (versus "evolutionary") technological advances; (2) the development of "enabling" technologies, i.e. core concepts that create numerous opportunities for the development of components, subsystems, products and services; and/or (3) the development of "infratechnologies,"⁶ such as fundamental advances in integrated systems or processes (e.g. advanced metering), that pave the way for competitive development.

Examples of topics which do not fit into any of the primary focus areas listed below, but can be considered as strategic initiatives, include system reliability

⁶ From "Challenge and Change in Collaborative Research," Ric Rudman and Peter Jaret, EPRI Journal, Jan./Feb. 1997.

RD&D activities and assessments of energy-related technology, market or institutional barriers.

Although strategic energy RD&D efforts often entail higher risks than do evolutionary RD&D efforts built on incremental advances, strategic efforts also generally have the potential to provide higher and/or multiple benefits when they are successful. Thus, there is an important niche for these strategic projects in the PIER program portfolio.

Objectives for strategic RD&D efforts include: (1) performing RD&D activities related to "strategic" energy technologies or services, as defined above; (2) obtaining information and performing assessments concerning strategic energy issues; and (3) supporting the strategic integration of new technologies or processes into California's energy system.

B. FOCUS AREAS AND OBJECTIVES FOR THIS RD&D PROGRAM

The Energy Commission has concluded that the primary focus areas and objectives for the PIER program should be framed broadly and at a high level to allow research providers and the PIER program administrator(s) flexibility to pursue innovative concepts and research approaches. Below are descriptions of the four major focus areas for the PIER program, along with important issues and the objectives for each of these focus areas.

1. Renewable Energy Focus Area and Objectives

Definition: Renewable energy sources include solar radiation, geothermal fluids, biomass, water, and wind available for conversion to energy. Technology applications include, but are not limited to: photovoltaic systems; solar thermal generation and industrial process heat; wind turbines; hydropower;

generation and/or direct utilization of geothermal resources; and direct utilization of fuels derived from anaerobic digestion, fermentation or other conversion of biomass, residues and wastes to produce electrical energy. Renewable technologies hybridized with fossil-fuel fired energy are acceptable within the definition of renewable energy.

Renewable energy provides public benefits such as energy diversity and security, improved environmental quality, increased benefits to local and regional economies, improved management of natural resources through the use of indigenous energy resources, and protection of public health and safety.

Issues: The primary issue confronting almost all renewable energy applications is how to compete in a deregulated energy market. Recognizing this dilemma, the Legislature established a \$540 million four-year fund under AB 1890 to help existing, new, and emerging renewables transition to a competitive market. However, there is also a need for RD&D to advance renewable technologies toward a cost-competitive stance. Therefore, one of the PIER program focus areas is renewables. The PIER program should coordinate its renewable energy RD&D activities with the AB 1890 Renewables program in order to realize synergies between the two efforts, help establish the market connection for renewables emerging from RD&D, and avoid unnecessary duplication.

Opportunities also exist for most renewable technologies to overcome critical technical barriers in the areas of reducing environmental impacts, increasing efficiency and tapping the benefits of system integration. PIER program funding should be made available for these types of activities.

Objectives in the renewable energy focus area include:

- Conducting RD&D concerning new technologies or approaches that enhance the technical performance and/or affordability of renewable energy resources;
- Providing analytical tools and information to improve renewable energy products and services; and
- Coordinating with other existing and emerging energy technologies or approaches to enhance the diversity and sustainability of California's energy resources.

2. End-Use Energy Efficiency Focus Area and Objectives

Definition: This focus area includes RD&D activities that either: (a) reduce the energy input requirements per unit of energy output or service of end-use devices or systems; or (b) conserve energy by reducing demand for energy goods and services. Examples of reducing energy input requirements are changing the seasonal energy efficiency ratio (SEER) of an air conditioner from 10 to 20, or adding insulation to a building, which has the combined effect of reducing the size of the air conditioner and reducing the amount of energy it will take to make the building comfortable. An example of energy conservation would be installing and utilizing equipment that reduces indoor lighting levels when rooms or buildings are not occupied.

Public benefits achievable in the end-use efficiency focus area include improved air quality, decreased use of fossil fuels, reduced expenditures on energy by consumers, and increased statewide and regional economic benefits.

Issues: End-use energy efficiency RD&D activities generally address the potential for cost-effectively improving the performance of energy-consuming technologies, products or services. In this context, it is important to

understand the relationship between higher efficiency and other attributes that are competing for the end-user's attention. The success of energy-efficient innovations often depend on their ability to enhance other attributes of goods and services, such as comfort or safety. In this context, RD&D concerning consumer behavior related to energy use can provide essential information.

Efforts to improve end-use energy efficiency are also often aided by systematic and/or synergistic approaches. For example, when the energy efficiency of a lighting system in a commercial building is improved, the need for air conditioning is also reduced. Therefore, a key end-use efficiency issue is understanding and learning how to exploit such interrelationships.

Another energy efficiency concern is how to more directly connect RD&D activities to the markets that will use the RD&D results. In this case, the PIER program has a potentially valuable ally in the Energy Efficiency (EE) program established by AB 1890. This program, also using public purpose surcharge funds, will target market transformation activities associated with energy efficiency. The PIER program can support RD&D to advance end-use energy information, products and services to the point where they become candidates for inclusion in the energy efficiency market transformation activities. Wherever possible, the PIER program should coordinate its end-use efficiency RD&D efforts with the Energy Efficiency program's market transformation activities, thus maximizing opportunities to improve the effectiveness and minimize the duplication of effort for both programs.

Objectives: Objectives in the end-use energy efficiency focus area include:

- . Conducting RD&D concerning new technologies or approaches that will reduce the energy input

requirements per unit of energy output or service of end-use devices or systems;

- . Conducting RD&D concerning technologies or approaches that will conserve energy by reducing demand for energy goods or services;
- . Providing analytical tools and information to improve the energy efficiency of end-use technologies, products or services; and
- . Coordinating with other end-use energy efficiency programs and research providers to enhance California's end-use energy efficiency efforts.

3. Environmentally Preferred Advanced Generation Focus Area and Objectives

Definition: Environmentally preferred advanced generation is broadly defined as RD&D activities targeting the development of super-efficient electric generation technologies using clean fuels. In determining whether a particular fuel is "clean" or not, consideration must be given to environmental impacts across the entire fuel cycle of the type of generation proposed (e.g. including fuel production, transportation, refinement and generation). RD&D efforts in this area should address improvements in generation efficiency and/or environmental performance. Examples of generation systems in this focus area include, but are not limited to, new advanced generation cycles, fuel cells of all types, and next generation gas turbines.

Benefits from RD&D efforts in the environmentally preferred advanced generation focus area include cost savings, improved environmental quality, and reduced fuel consumption.

Issues: The California Public Utilities Commission has stated that generation-related RD&D efforts should be provided by the competitive market. However, while the competitive market may provide support for those RD&D activities which provide adequate benefits for private-sector entities to capture, it will not provide adequate support for activities with primarily "public goods" attributes. For example, the competitive market may support near-term incremental improvements to commercially available generating products, but it is unlikely to provide adequate support for revolutionary RD&D efforts needed to make significant improvements in generating technologies or to develop advanced generating technologies. Support may be needed to enable some new advanced generating technologies to prepare for competitive participation in the restructured energy markets.

Objectives: Objectives in the environmentally preferred advanced generation focus area include:

- . Conducting RD&D concerning technologies and processes that would improve the efficiency, cost, and environmental performance characteristics of environmentally preferred advanced generation technologies;
- . Providing analytical tools and information to improve environmentally preferred advanced generation;
- . Coordinating with other environmentally preferred advanced generation programs and research providers to enhance California's electric system.

4. Environmental Research Focus Area and Objectives

Definition: Energy production, delivery and use affect various aspects of the environment such as the quality of our air (both outside and indoors), the

quality and availability of our water resources, the populations and habitat of aquatic and terrestrial wildlife and plants, our aesthetic response to the viewshed, the occurrence of hazardous material and toxic wastes, and our cultural and recreational resources. These impacts are usually difficult to quantify and to separate from non-energy influences.

The environmental efforts of the PIER program should aim at understanding and/or addressing the environmental effects and costs of energy production, delivery and use in California, as well as exploring how new energy applications and products can solve environmental issues.

Issues: Whenever energy is extracted, collected, transported, converted or utilized there are environmental impacts. The activities in this focus area should be directed at better understanding and/or addressing the effects of those processes. One promising research angle is investigating how new technology applications can be developed to reduce emissions and retain industry in California.

Objectives in the environmental focus area should include:

- . Conducting RD&D to determine and evaluate specific environmental effects related to energy production, delivery and/or use for major energy technologies in California;
- . Conducting RD&D efforts concerning technologies and processes for understanding or addressing environmental effects, and related costs or benefits of energy production, delivery, and use;
- . Providing analytical tools and information to enhance environmental quality beyond current regulatory standards; and

- Coordinating with other energy and environmental efforts to enhance California's overall environmental quality.

C. ELIGIBILITY AND SELECTION GUIDELINES

The eligibility and selection guidelines below can be applied to all RD&D activities under consideration, across all focus areas, and regardless of whether projects are funded through solicited or unsolicited proposals. More details regarding the eligibility and selection criteria may need to be developed through the operational plan(s).

1. Eligibility Guidelines

Eligibility guidelines should provide the first level of screening for proposals submitted to the PIER program for funding consideration. At the end of this screening, an eligibility "go" or "no go" decision should be made; either a proposal is judged to be eligible for further consideration or it is not. Projects which are not eligible will not require further expenditure of limited overhead funds. Following are the eligibility screening guidelines recommended for the PIER program:

- Projects must meet the statutory definition of public interest RD&D, i.e.---
 - Advances science or technology which provides benefits to California citizens; and
 - Is not adequately addressed by competitive and regulated markets.

- . Projects must be consistent with the PIER program's Mission and Objectives.

2. Selection Guidelines

Once a proposal is judged to be eligible for PIER program funding consideration, it should be reviewed and evaluated according to the following merit-based selection guidelines:

Public Benefits: Evaluate the level of public and private benefits in comparison with the proposal costs to be funded by the PIER program and collaborative participants. Public benefits can include improvements to the quality of the environment above and beyond current legal requirements, beneficial utilization of indigenous and/or renewable sources of energy, reduction in statewide energy requirements, increases in the overall efficiency and reliability of generation or end-use of energy, and positive impacts on the economies at the regional or statewide levels through, for example, consumer cost savings and creation of jobs.

Quality of Proposal: Determine the degree to which the proposal helps to advance the objectives of one or more of the PIER program's focus or strategic areas. Evaluate the quality of the proposal to determine if the goals, objectives and work statement represent technically viable means to resolve the major barriers. Evaluate whether the proposal describes the relationship of related RD&D efforts to ensure the proposal represents a synergistic approach without duplication of effort. Evaluate whether there is a realistic technical and financial vision for transferring results of the proposal into the marketplace within a defined timeframe, and the proposed level of cost-sharing appropriate to the type of proposal being considered. Evaluate the size of the applicable niche and/or mass markets and gauge the likelihood for commercial success. Evaluate whether the budget and timeframe for the proposal are sufficient to achieve the desired results.

Qualifications of Research Team: Gauge the strength and viability of the proposer's team based on: (1) the knowledge, qualifications and experience of key individuals; (2) the past performance, financial stability and level of commitment; (3) the plans for, and track record of, transferring research results into the marketplace; and (4) the plans for collaboration and/or an alliance path to the market where appropriate.

Policy Consistency: Assess the technical, market and financial risks of the proposal and the likelihood of and timeframe for success. Weigh the results of these evaluations with the degree to which the proposal advances the objectives of one or more focus areas, and is consistent with State energy policy.

Preferences: Evaluate all preferences or other considerations required by law or specified in the PIER program's operational plan(s) (e.g. project and/or lead entity is located in California).

D. SELECTION PROCESS

The Strategic RD&D Plan establishes the overall PIER program direction through its focus areas and objectives. The merit-based selection guidelines should be the primary basis for project selection. Proposals should be evaluated for consistency with State energy and PIER program policies to determine whether the proposal fits into a balanced PIER program portfolio. The RD&D Strategic Plan does not establish fixed percentages for focus areas or other specific measures of balance, recognizing that program balance will be established in relationship to the actual portfolio of existing projects and incoming proposals. However, preliminary funding ranges for specified program areas will be established through implementation of the operational plan(s). These funding ranges and allocations will, of course, need to be administered flexibly and adjusted periodically to ensure that the PIER program remains based on merit and evolving public interest RD&D needs.

Collaborative and/or cost-shared projects with public and private partners are important to transfer technology and to help ensure that the PIER program has a lasting commercial benefit. These types of projects may need to offer the protection of intellectual property rights and patents to project participants from the private sector.

The operational plan(s) should further guide the implementation of a balanced portfolio of projects. The specific criteria and sequence of the project selection process should be spelled out in the operational plan(s). This process should be reviewed and updated periodically.

While the PIER program and its advisory and review committees should evaluate new proposals using the eligibility and selection guidelines adapted into a qualitative and quantitative evaluation framework, the selection process may be different for proposals to continue existing projects. The selection process should allow flexibility for the PIER program and its advisory and review committees to exercise their best professional judgment to identify opportunities for collaboration, potential for cost-sharing, and options for exchange of results. The PIER program and its advisory and review committees should attempt to maximize synergies among projects and proposals, while ensuring consistency with the program's overall Mission and Objectives.

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RD&D STRATEGIC PLAN

CHAPTER IV: GOVERNANCE OF THIS RD&D PROGRAM

A. OVERALL GOVERNANCE

In order to obtain meaningful and measurable results, the governance structure of the PIER program must be capable of effectively and lawfully carrying out the Mission and Objectives of the organization. Therefore, the governance structure should be streamlined and designed to ensure public input and accountability, efficient administration and stewardship of resources (e.g. in contracting, personnel and budgeting), and statewide leadership for California's public interest RD&D efforts.

The PIER program should also be able to perform a variety of program functions including technology and market assessments; overall management and review of the projects and program; coordination and collaboration with other research organizations and programs; and providing support to its advisory and review committees.

B. ROLES AND FUNCTIONS OF THE PROGRAM

In order to ensure that the public interest RD&D program will be effectively administered, the following roles and functions for the PIER program are identified:

1. Policy Implementation - The PIER program should provide input to the formulation of State energy policies relating to the program's Mission and Objectives, with an emphasis on articulating the roles and benefits of public interest energy RD&D. Thus, for example, reports concerning various PIER program efforts should be periodically submitted to the CPUC, the Legislature, and other policymakers responsible for developing and/or implementing energy policies affecting California. The PIER program should also be responsible for implementing state policies related to its Mission and Objectives.

2. Program Planning - The PIER program's planning efforts should be undertaken at levels corresponding to its organizational structure and funding areas.

The PIER program, with input from its advisory and review committees and interested stakeholders, should annually conduct a high-level review of both

its strategic and operational plans. These efforts should address the changing roles and needs of public interest RD&D.

Future RD&D strategic plans should provide broad outlines of the appropriate areas of RD&D focus, including new focus areas analogous to the descriptions of RD&D focus areas and objectives contained in the initial RD&D Strategic Plan. Since funding for "multi-year" RD&D projects is likely to take an increasing share of available program funds as awards are made, future strategic plans should also explicitly recognize the status and anticipated role of ongoing "multi-year" research activities versus "new" projects within the larger scope of the PIER program.

A second, more specific layer of planning will need to be conducted as part of the PIER program's operational plan(s). The operational plan(s) will be prepared by the Energy Commission staff, with advice from the PIER program's advisory and review committees. The operational plan(s) should, among other things, include decisions concerning continuation of multi-year research projects. This aspect of the update will grow in importance as the PIER program becomes established. The operational plan(s) should also describe a limited number of high-need/high-benefit public interest RD&D areas in which efforts will be made to initiate new multi-year research projects. This will be especially important in the early years of the PIER program's operation.

In addition to input from the advisory and review committees, the development of new target areas should use public workshops and other means of obtaining stakeholder input. The process may also draw on the results of "scoping studies" that may be commissioned by PIER program, and on the results of investigator-initiated exploratory research projects.

These PIER program planning and updating processes should be designed for maximum simplicity and efficiency, minimum time and resource requirements, and result in strategic and operational plans that are responsive to changing conditions. The plans should be flexible and avoid fragmenting the program with small categories of funding allocations.

3. Establish Funding Guidelines and Mechanisms

Funding guidelines should require that all proposals be subject to a formal application and review process. Each activity funded by the PIER program should be evaluated based on the proposal's merit and anticipated contribution to the program's Mission and Objectives. All proposals should be evaluated against the eligibility and evaluation criteria listed in Chapter III of this RD&D Strategic Plan, and any additional criteria that may be listed in the operational plan(s).

Proposals to the PIER program may be either (a) unsolicited; or (b) in response to either an open or targeted competitive solicitation.

Funding mechanisms for proposals can include both individual awards and block awards for groups of RD&D projects. Individual projects should be funded using contracts, grants, loans or other agreements as the basis of these funding awards. Block awards should be available for meritorious proposals submitted to the PIER program by other RD&D organizations.

Proposals for all block awards should be evaluated based on eligibility and selection criteria. In addition, any projects subsequently funded by an RD&D organization receiving a block award should also be evaluated to ensure that these projects are consistent with the PIER program's eligibility and selection

criteria. Block awards could take the form of contracts, grants, loans or other agreements.

4. RD&D Activities - Most of the PIER program's actual RD&D activities should be funded through contracts, grants, loans or other agreements to outside parties. However, this is not intended to exclude the Energy Commission staff from participating in technology assessments, planning activities, or personnel exchanges provided conflicts of interest are avoided.

5. Leadership, Coordination and Collaboration - In order to develop and maintain California's leadership in public interest RD&D, the PIER program should at a minimum:

- a) seek to utilize California's established energy RD&D resources and infrastructure;

- b) seek to leverage and combine other state, federal, and private RD&D funds with PIER program projects;

- c) create formal coordination and collaboration arrangements with other public interest programs, including those administered by the Energy Commission, CPUC, Energy Efficiency and the Renewables program administrators; and

- d) coordinate activities with RD&D being conducted by investor-owned and municipal utilities, colleges and universities, national laboratories, private firms, and collaborative research organizations such as the Electric Power Research Institute or the Gas Research Institute.

6. Technical Management - The PIER program should be responsible for plan updates, technology and market assessments, preparation of solicitations, review of proposals, project management, and coordination and support of the advisory and review committees.

7. Program Administration - In this function, the PIER program should provide administrative activities such as contracting, accounting, and similar services consistent with Objective #6 in Chapter II of this RD&D Strategic Plan. These administrative functions should be streamlined.

8. Program Evaluation - In order to maintain an effective and dynamic program that is responsive to the energy needs of California, it is important that the Energy Commission review its strategic and operational plans, periodically evaluate the effectiveness of its program, and look for new opportunities to improve its operation. At a minimum the Energy Commission should:

a) Conduct an annual review of its program, projects and strategic and operational plans;

b) Oversee a periodic, independent, external program review and evaluation process. The first evaluation should be completed no later than July 1, 2001;

c) Develop qualitative and quantitative measures for determining how well the PIER program is satisfying its Mission and Objectives. These measures of success should include program benefits, an open and flexible planning process, effective and efficient program implementation, public accountability, effective collaboration with RD&D infrastructure, program cost effectiveness, and a balanced portfolio of projects.

C. ADVISORY & REVIEW COMMITTEES

Two levels of advisory and review committees should be formed, each responsible for different functions of the PIER program. This RD&D Strategic Plan does not specify the precise methods for selecting these committees, and

further details will need to be established as the operational plan(s) are implemented.

The first level should include a Policy Advisory and Review Committee which will be responsible for making recommendations on overall policy, coordination and linkages to other RD&D organizations, and evaluation of how well the program is meeting its Mission and Objectives. This committee would also be responsible for overseeing an independent review of the PIER program, discussed in Section D of this Chapter, below.

The second level should include a Technical Advisory and Review Committee which will be responsible for providing technical expertise in reviewing and evaluating proposals for new and ongoing projects, and in evaluating technology issues and needs.

Both advisory and review levels should have a flexible structure to allow for changing conditions. In addition, these committees should be able to form subcommittees or appoint special committees to address particular needs or issues as they may arise.

1. Policy Advisory and Review Committee - This should be a standing committee composed of high-level executives or appointees, providing overall program policy recommendations, including focus area objectives, operational policies, funding priorities for focus areas, coordination with other RD&D organizations and public interest energy programs (e.g. the AB 1890 Energy Efficiency and Renewables programs), and a yearly review of the PIER program. The annual review should be timed so that the results can be incorporated in the following year's plans and activities. The Policy Advisory Committee will

prepare and submit an annual report of its findings and recommendations to the Energy Commission.

2. Technical Advisory and Review Committee(s) - This should be a committee or committees composed of energy RD&D professionals or energy experts. These committees should be organized according to the PIER program structure and provide specific program technical advice and recommendations on goals and targets, market need analysis, cross-cutting issues (e.g. coordination with the Energy Efficiency and Renewables programs), and funding options. These technical advisory committees should be allowed to form subcommittees on an ad hoc basis to provide special advice and recommendations on such things as solicitations, proposal review and project selection, project technical assistance, contract management and termination, and technology peer reviews and need assessments. These activities should be conducted in a manner which seeks to avoid conflicts of interest.

D. INDEPENDENT EVALUATION PROCESS

In addition to the efforts of the Policy and Technical Advisory Committees, described above, an independent, external review group should periodically conduct an evaluation of the PIER program's process and programs and make recommendations on how the PIER program could more effectively meet its Mission and Objectives. Members of this external review group should be selected based on their independence, unbiased technical expertise in some aspect(s) of the PIER program, and their experience in working with or managing an RD&D program. Members of this external review group should not have conflicts of interest with the PIER program. Their first evaluation should be completed on or before July 1, 2001.

E. REMAINING "MILESTONES" TO COMMENCING PROGRAM OPERATIONS

In order for the PIER program to achieve the goal of having public interest RD&D activities under way by January 1, 1998, several remaining "milestones" must be dealt with before January 1, 1998. Listed below are the major remaining "milestones":

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|---|-------------|
| 1. Energy Commission adopts the strategic plan | June 1997 |
| 2. Legislature adopts administrative and expenditure criteria | Summer 1997 |
| 3. Energy Commission initiates implementation of the strategic plan, including development of the operational plan(s) | Summer 1997 |
| 4. Energy Commission initiates funding award process | Fall 1997 |

In anticipation of the Energy Commission's adoption of this RD&D Strategic Plan, development of various elements in the operational plan(s) has already begun. These elements include:

- **DRAFTING LEGISLATION:** The Energy Commission has drafted and forwarded proposed bill language to the Legislature regarding the Commission recommended "administration and expenditure criteria," selection criteria, solicitation mechanisms, reporting requirements, and other streamlining provisions needed to effectively implement the PIER program. The Commission expects this bill language to become part of Senate Bill 90 (Sher), which will be taken up by the Legislature during the 1997 Legislative Session.

The RD&D Committee will hold at least one workshop to allow public comment on this proposed bill language prior to action by the Legislature. Any changes to the current bill language will be submitted to the full Commission for approval.

- **FORMING POLICY AND TECHNICAL ADVISORY COMMITTEES:** The nature of these advisory committees has been discussed in conceptual fashion earlier in this chapter. The next step is to specifically define the roles, products and composition of these advisory committees, and then to actually appoint the members. The Commission expects to undertake these efforts in the very near future.
- **ESTABLISHING A PUBLIC PARTICIPATION PROCESS:** Given the extremely short timeframe for developing many of the essential elements of the operational plan(s), it will not be possible to use the same lengthy collaborative process that was used to develop this RD&D Strategic Plan. However, the policy and/or technical advisory committees will provide one level of public input to the process. In addition, public workshops will be scheduled where possible to allow further public participation regarding key decision points. Finally, of course, all Committee and/or Commission hearings will be publicly noticed and open to the general public.
- **FURTHER REFINING FOCUS AREAS, GOALS AND TARGETS FOR FOCUS AREAS, AND ASSOCIATED BUDGET ALLOCATIONS:** These essential elements of the PIER program design effort will be developed over the next few months with input from a number of sources such as: (a) staff-generated *Market and Technology Needs Assessments*; (b) related, synergistic assessments by other research institutions; (c) input from the policy and technical advisory committees; and/or (d) discussions with broader segments of the public.
- **CONDUCTING MARKET AND TECHNOLOGY NEEDS ASSESSMENTS:** In order to make informed decisions on budget allocations, goals and targets for focus area solicitations, assessments of technology status and market needs are essential. This effort will be accomplished by the

Energy Commission staff in several stages over the next few months.

- **DEVELOPING FUNDING GUIDELINES, MECHANISMS AND SOLICITATION OPTIONS:** SB 90, when passed, is expected to provide significant legal flexibility to the Commission in its solicitation and funding mechanisms under the PIER program. However, to maximize ratepayer benefits, other efforts must also be undertaken including the need for improved internal efficiency of program administration. To the extent possible, these efforts will be addressed and resolved during the fall of 1997.
- **ESTABLISHING PROGRAM AND PROJECT EVALUATION PROCESSES:** This evaluation process must be initiated soon to ensure that appropriate evaluation measures are incorporated into both the program design and the solicitation process. In addition, an annual program evaluation process will need to be done by the Policy Advisory Committee, and a wholly independent evaluation of the PIER program will need to be completed on or before July 1, 2001.
- **IMPLEMENTING ACTUAL SOLICITATIONS:** Once the above elements of the Operational Plan are established, a number of solicitations suitable to fund a portfolio of PIER projects will be implemented. The Commission expects this solicitation process to begin in the fall of 1997.

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APPENDIX "A" TO RD&D STRATEGIC PLAN

March 31, 1997

Commissioner David Rohy, Presiding Member
Research, Development and Demonstration Committee,
California Energy Commission
1516 Ninth Street
Sacramento, California 95814

Re: RD&D Strategic Plan Report

Dear Commissioner Rohy:

Following the Research, Development and Demonstration (RD&D) Committee's initial public hearing on implementing the RD&D provisions of AB 1890, an ad hoc advisory group was formed to prepare, among other things, a strategic plan report for the Committee and Commission to consider. The advisory group held seven day-long, public workshops throughout the state, during which participants extensively debated and discussed this topic. The Committee was given an interim "status report" on this effort during a public hearing held in Sacramento on February 5, 1997, and the advisory group has now completed its work.

The advisory group has reached consensus that California's public interest RD&D efforts should be guided by a Strategic Plan which contains, among other things: (1) the Mission and Objectives of the program; (2) the primary focus areas and selection procedures for RD&D proposals; and (3) the major governance functions and responsibilities for implementing this effort. To assist the Committee in this regard, the undersigned members of the advisory group are now submitting the attached "RD&D Strategic Plan Report" for your consideration.

We understand that the Committee intends to hold a public hearing on this matter on April 17, 1997. At that time, all members of the advisory group, and the public, will be given an opportunity to express their individual views regarding the attached report and related issues concerning this public interest RD&D program. We look forward to participating in the hearing, and in subsequent efforts to develop a model public interest RD&D program for California's restructured electric services industry.

Sincerely yours

cc: All CEC Commissioners

Michael DeAngelis on behalf of
The RD&D Advisory Group
(See Attached List)

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